

(12) UK Patent Application (19) GB (11) 2 352 587 (13) A

(43) Date of A Publication 31.01.2001

(21) Application No 9917415.3

(22) Date of Filing 23.07.1999

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(51) INT CL⁷

H04Q 7/22 // G09B 5/06 29/10

(52) UK CL (Edition S)

H4L LDGX LDPB L205

(56) Documents Cited

GB 2327565 A GB 2275120 A US 5929848 A
US 5796351 A US 5732326 A

(58) Field of Search

UK CL (Edition R) G5G G2 , H4L LDGX LDXX LDPP
INT CL⁷ G09B 5/06 29/10 , H04Q 7/22
On-line: WPI, EPODOC, JAPIO, INSPEC

(54) Abstract Title

A technique for obtaining information within a wireless network

(57) The present invention provides a technique for obtaining within a wireless network information concerning items of interest. The system of the invention comprises a base station 2 for communicating with a portable device 6 over the wireless network via a first wireless communication, and a map 20 identifying the items of interest. A beacon 4 is associated with each item of interest and arranged to transmit via a second wireless communication e.g. infra-red within a predetermined range a code identifying information associated with that item. Further, the portable device 6 has a first interface for communicating with the base station 2 and a second interface for communicating with the beacon 4. The portable device 6 is arranged when within the predetermined range to receive via the second interface the code transmitted by the associated beacon 4 for a particular item of interest, and to issue to the base station 2 via the first interface a request for information based on the received code, which may be a URL for accessing the WWW. The base station is arranged to cause the information identified by the code to be retrieved, and to transmit that information to the portable device. By this approach, it is possible for a wireless network to be used to distribute information concerning items of interest to the user of the portable device.

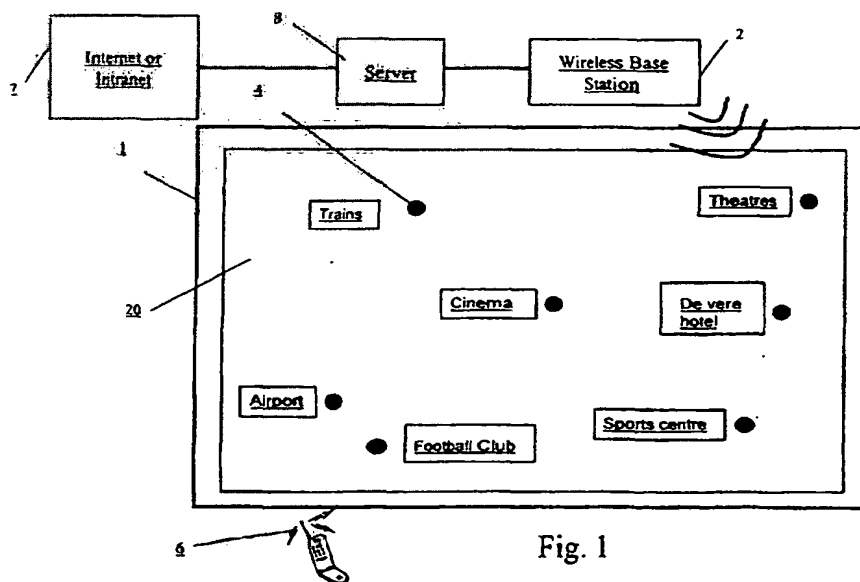


Fig. 1

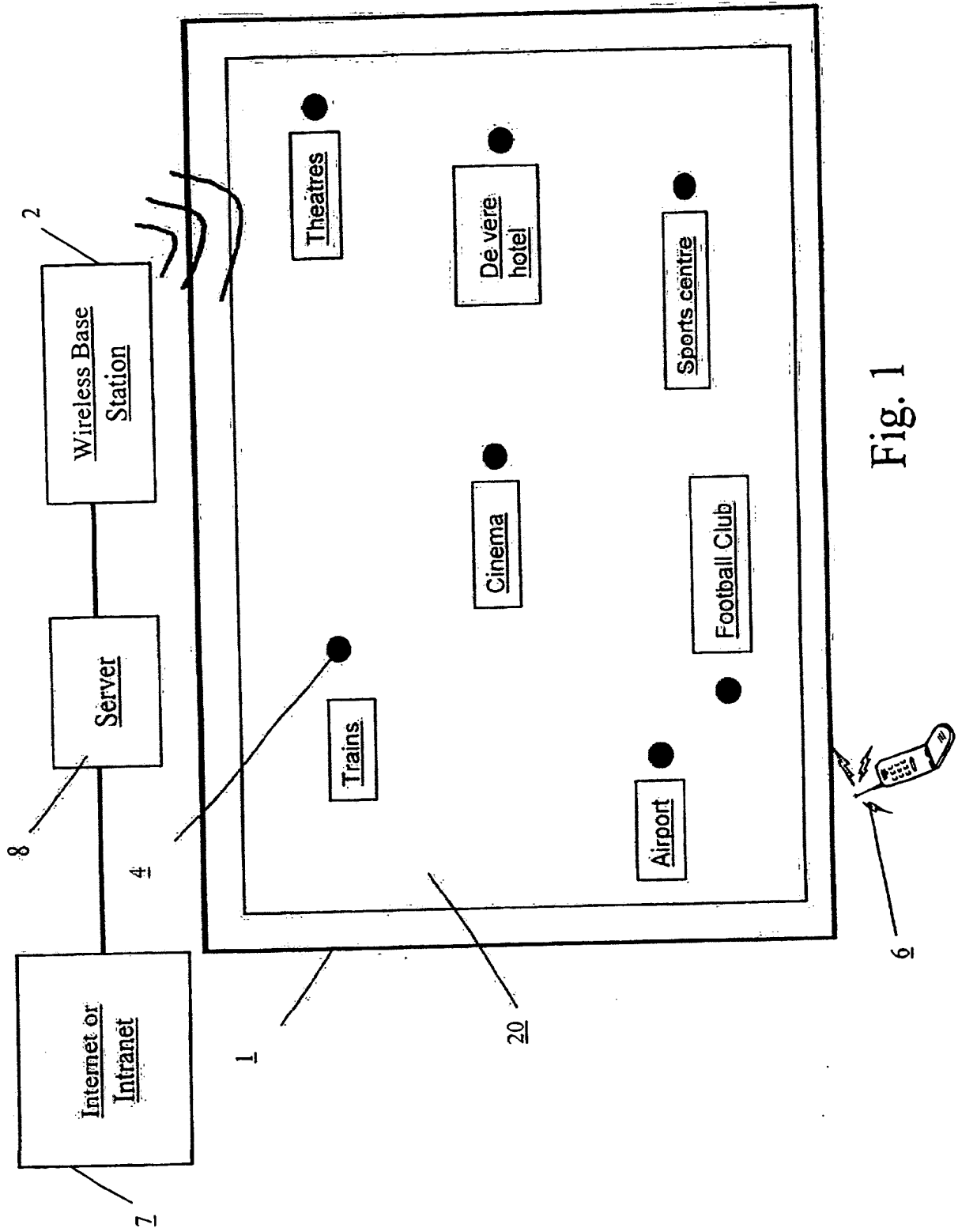
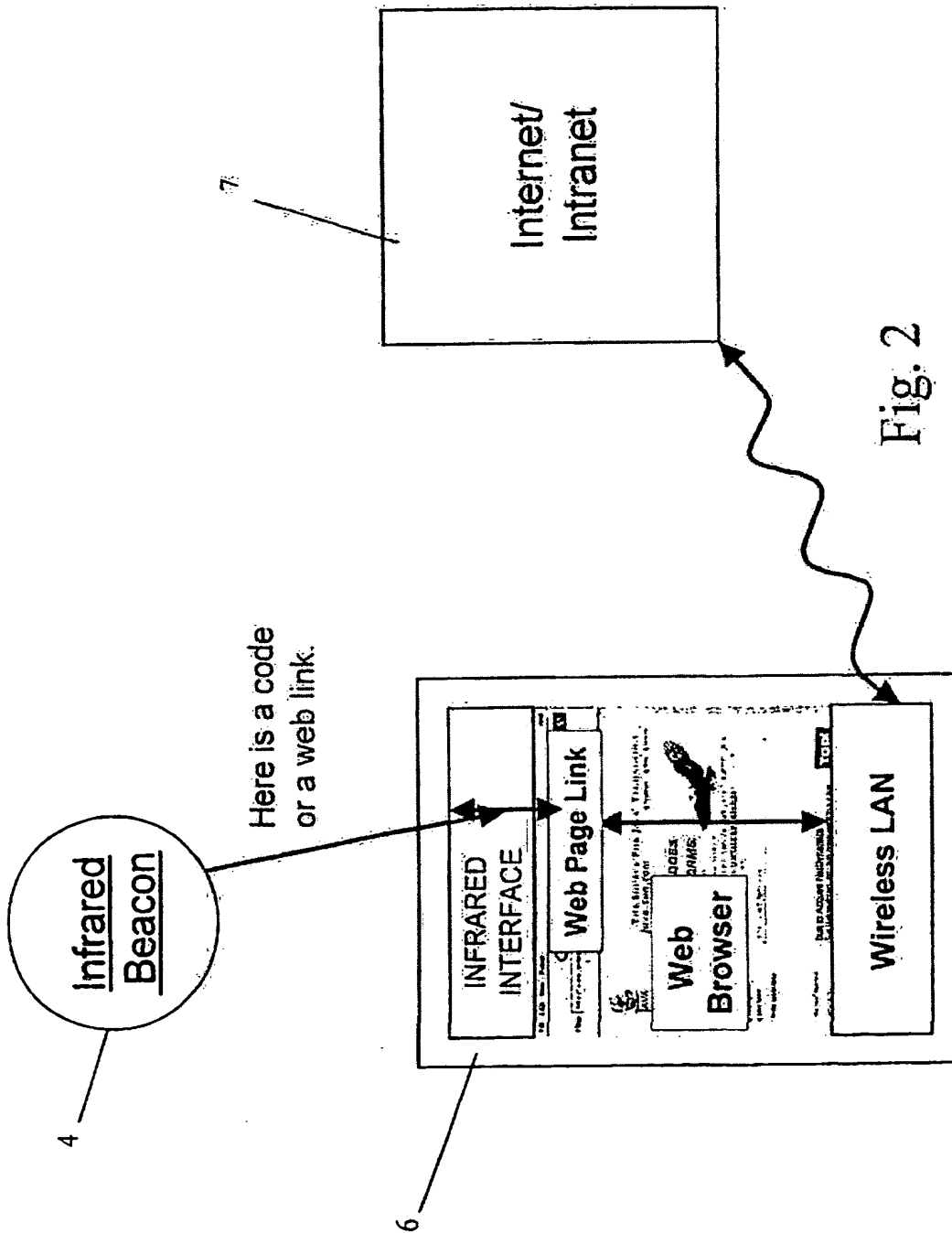


Fig. 1



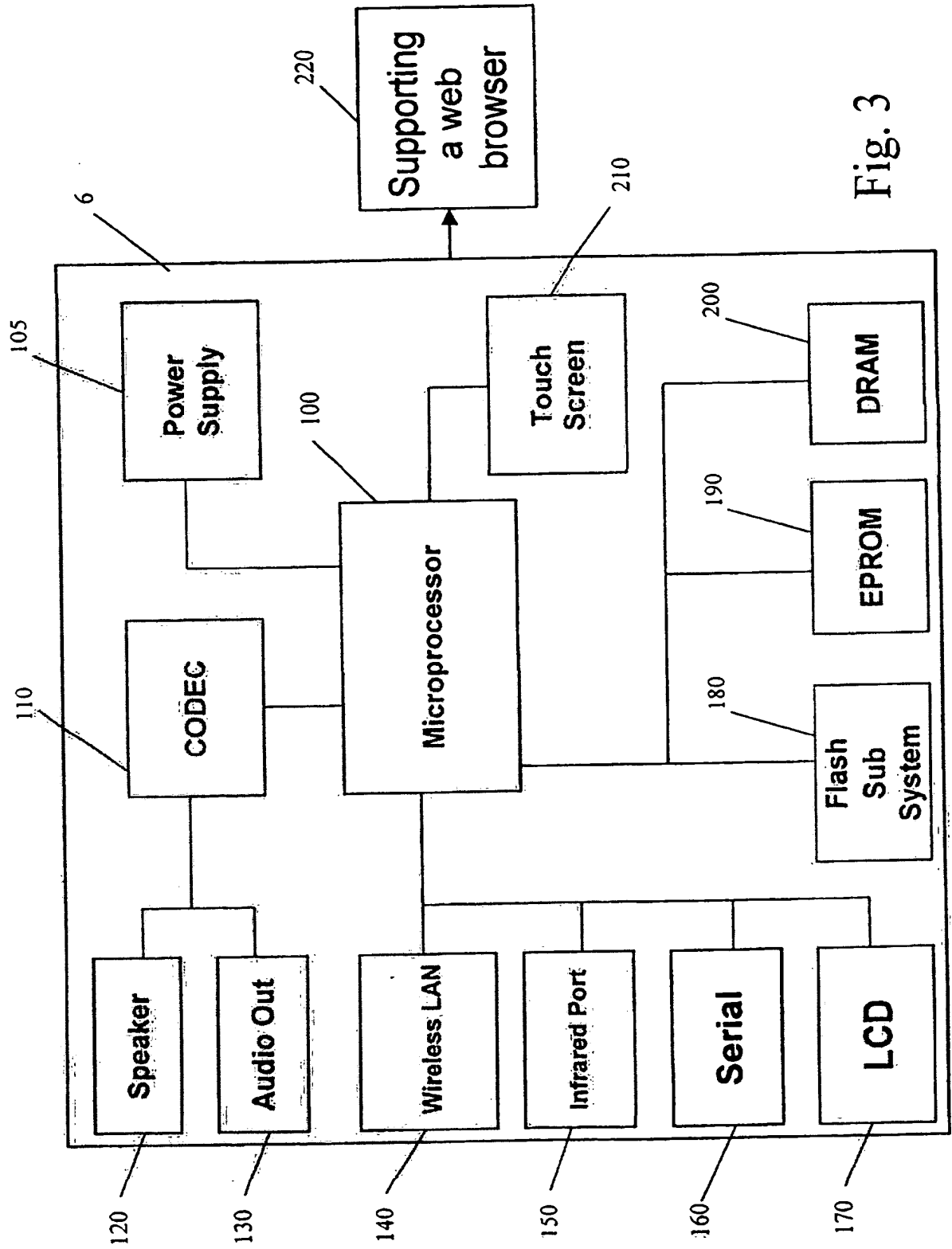


Fig. 3

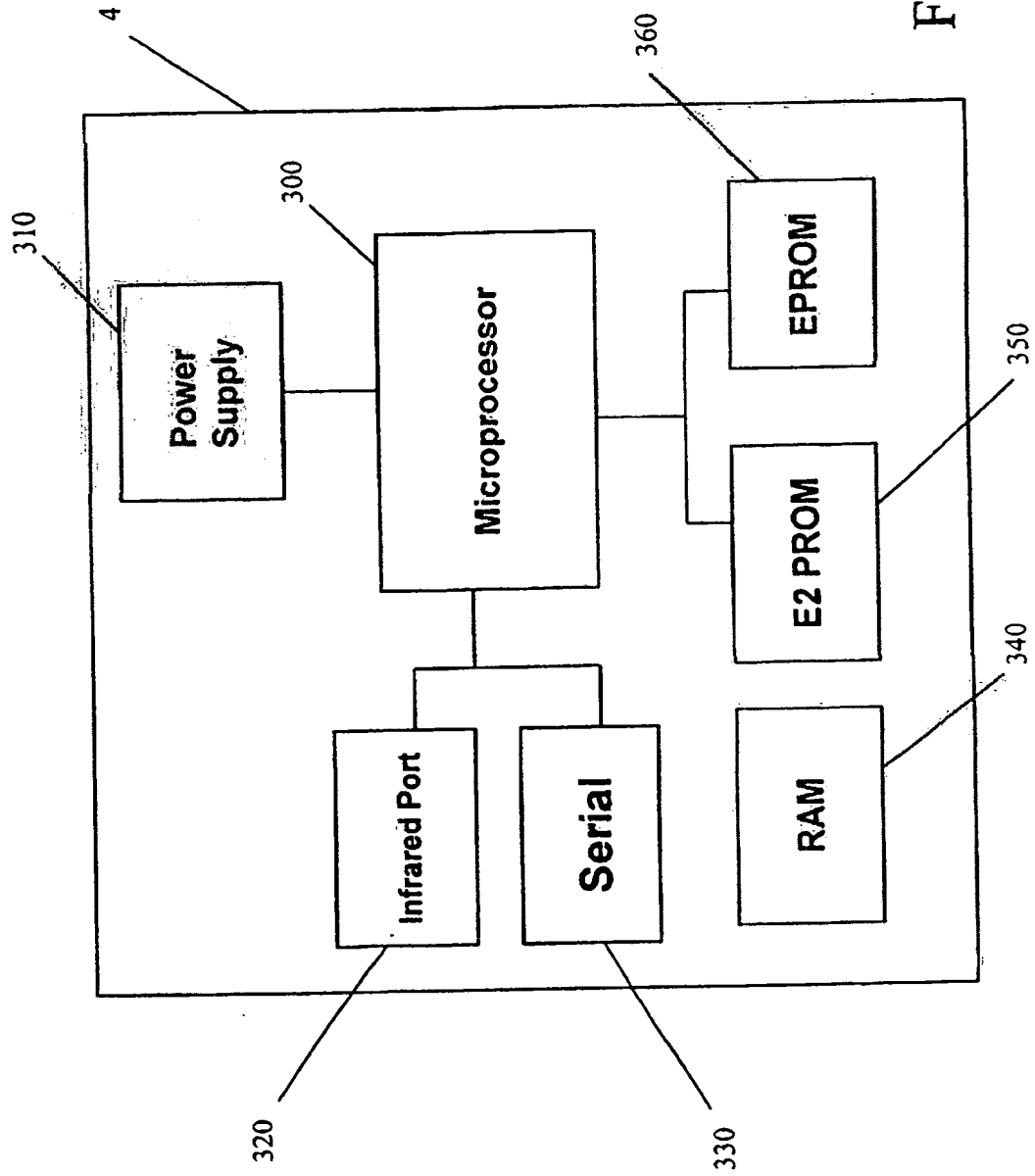
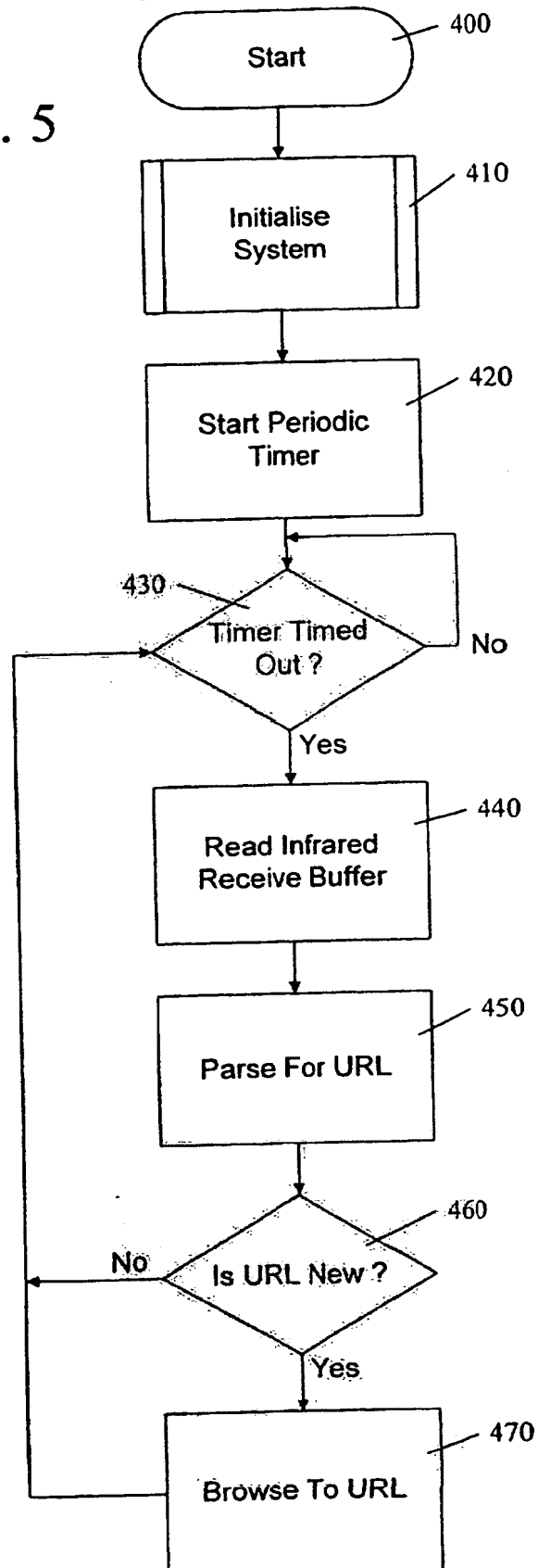


Fig. 4

Fig. 5



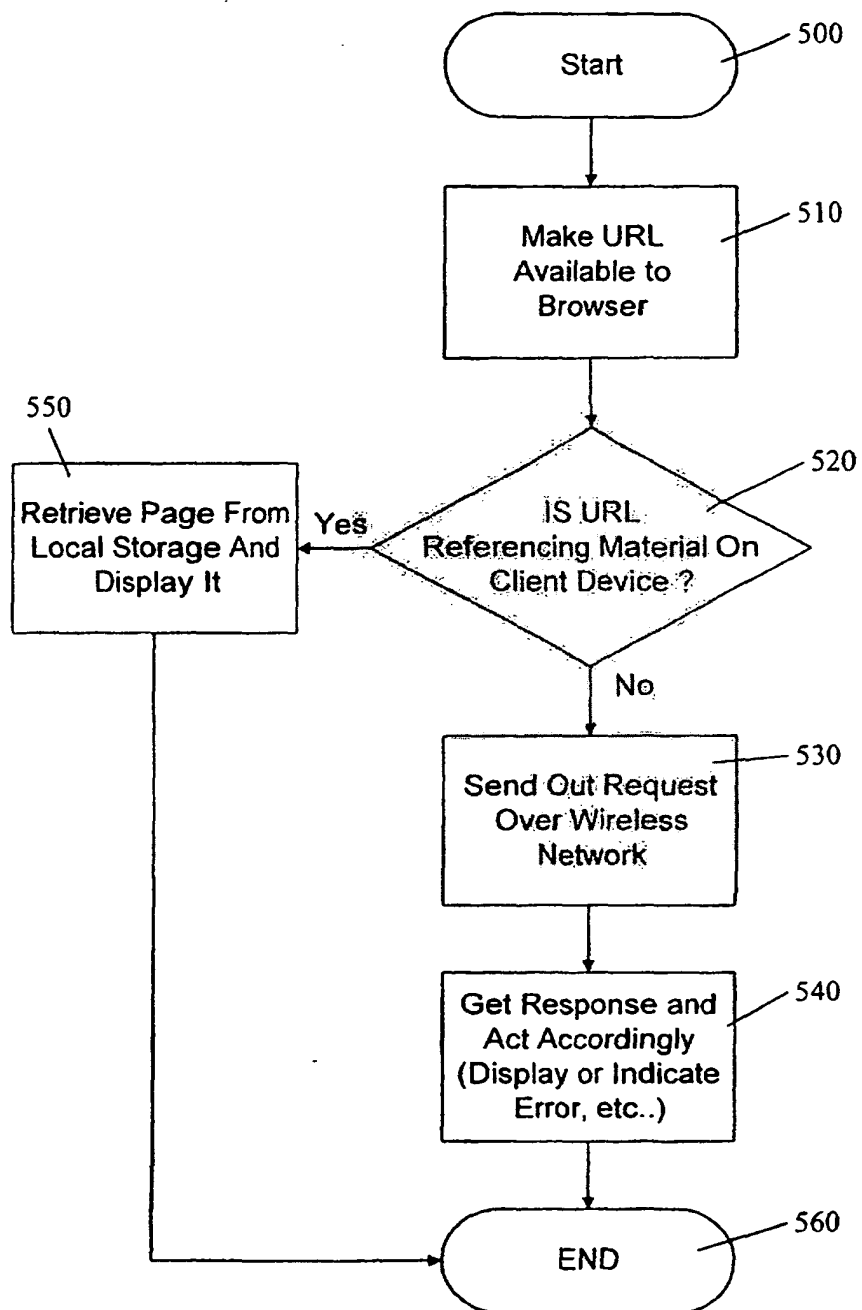


Fig. 6

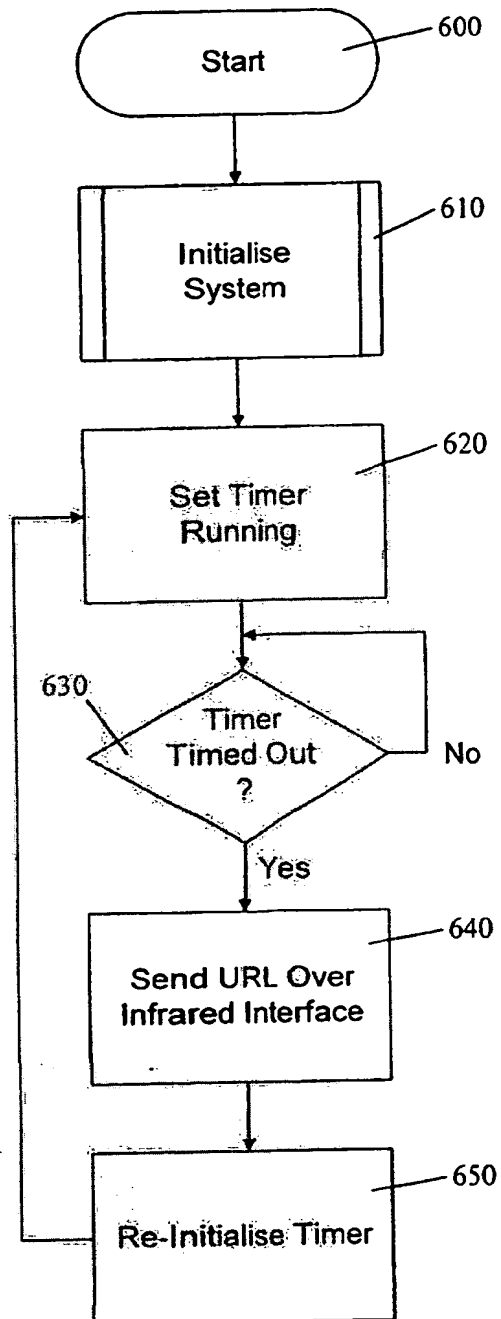


Fig. 7

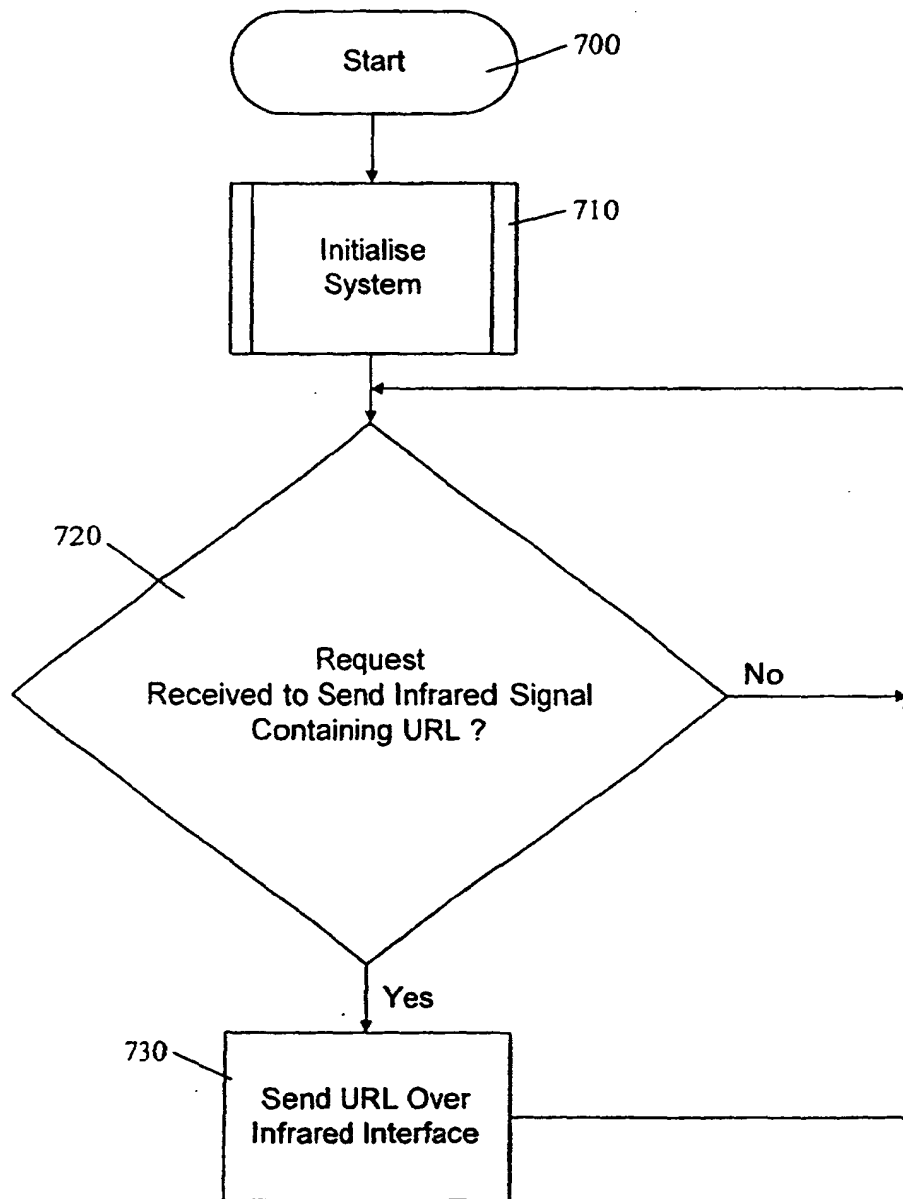


Fig. 8

A TECHNIQUE FOR OBTAINING INFORMATION
WITHIN A WIRELESS NETWORK

Field of the Invention

5 The present invention relates to a technique for obtaining information within a wireless network.

Description of the Prior Art

 It is often desirable to disseminate to individuals information about items that may be of interest to them. For example, when people visit towns and cities, parks, etc.,
10 they will often wish to obtain information about particular items of interest. For example, a visitor to a town may wish to find out more information about the cinema, a visitor to a park may wish to find out more information about a particular structure or land feature within the park, etc.

 There are a number of known ways of distributing such information. Firstly,
15 traditional maps may be used, with particular items of interest marked on the map, and optionally with associated information provided, such as the telephone number of a cinema, or other brief details. These maps may be hand-held maps which an individual carries with them, or may be large maps provided at fixed locations for reference by any individuals passing by. Whilst these maps clearly assist the user in finding their way
20 around, they are limited by size constraints as to the amount of information which they can provide about any particular items of interest.

 Accordingly, it would be desirable to provide a technique for enabling more detailed information to be provided to an individual.

Summary of the Invention

25 Viewed from a first aspect the present invention provides a system for obtaining within a wireless network information concerning items of interest, comprising: a base station for communicating with a portable device over the wireless network via a first wireless communication; a structure providing a representation of a real environment identifying the items of interest, and providing a beacon associated with
30 each item of interest and arranged to transmit via a second wireless communication over a predetermined range a code identifying information associated with that item; a

portable device having a first interface for communicating with the base station and a second interface for communicating with the beacon; the portable device being arranged when within the predetermined range to receive via the second interface the code transmitted by the associated beacon for a particular item of interest, and to issue
5 to the base station via the first interface a request for information based on the received code; the base station being arranged to cause the information identified by the code to be retrieved, and to transmit that information to the portable device.

The development of wireless technologies is now at a stage where the network capacity allows data to be transferred at high speeds. Examples of wireless
10 technologies which would support such data transfer are "Home RF", a derivative of Digital Enhanced Cordless Technology (DECT), Bluetooth, UMTS, or Wireless LAN. These technologies allow high speed data transfer, for example UMTS would allow high bandwidth data transfer up to 2 Mbits/sec, whilst Wireless LAN would allow data transfer up to 11 Mbits/sec. Details of the HomeRF Shared Wireless
15 Access Protocol (SWAP) can be obtained from the web page www.homerf.org. UMTS is the name given to the Third Generation Mobile Communication Standard covered by ETSI and ITU standards. Bluetooth is an adhoc scatternet for affordable and highly functional wireless connectivity, and specifications of it can be obtained from the web page www.bluetooth.com. Wireless LAN is defined by IEEE standards,
20 IEEE 802.11 and IEEE 802.11a, the latter being for high speed 11Mbits/sec interconnectivity.

Accordingly, it would be possible to distribute a large amount of information to individuals assuming those individuals had suitable portable devices for receiving that information over such a wireless network. Having realised the potential for such
25 emerging wireless technologies to disseminate information, a further problem to be solved is how to distribute information concerning items of interest to the user of the portable device.

In accordance with the present invention this problem is solved by the use of two separate wireless communications. Firstly, a wireless network is provided with
30 which the portable device can communicate via a first wireless communication, this wireless network being "pervasive", in that the structure identifying the items of

interest is entirely located within the coverage area of the wireless network. The wireless network coverage area may be composed of a number of base stations, each serving a portion of the coverage area.

Further, the structure contains a beacon associated with each item of interest
5 and arranged to transmit via a second wireless communication over a predetermined range a code identifying information associated with that item.

The portable device is provided with a first interface for communicating with the base station and a second interface for communicating with the beacons. By this approach, when the portable device is within the predetermined range, it can be
10 arranged to receive the code transmitted by the associated beacon for a particular item of interest, and based on that code the portable device can then issue to the base station a request for the information. The base station is configured such that it is able to cause the information identified by the code to be retrieved, and is then able to transmit that information to the portable device over the wireless network. In
15 preferred embodiments, this is done by routing the request from the base station to a server, where the information is retrieved. The wireless network preferably would support high speed data transfer to the portable device, and so, for example, could be one of the earlier mentioned wireless technologies.

By this approach, it can be seen that the emerging wireless technologies that
20 support high speed data transfer can be used to deliver information to a portable device for a particular item of interest, since the actual information transmitted is dependent on a signal transmitted by the portable itself based on a code received from a nearby beacon associated with an item of interest.

It will be appreciated that the items of interest may be anything upon which it
25 is desirable to distribute information, and so could be buildings, objects, landmarks, etc. Further, the structure can be any suitable structure for providing a representation of a real environment on which items of interest can be identified, and so the representation of a real environment may be supported on a separate structure, or the structure may directly provide the representation of the real environment. For
30 example, the representation of a real environment might be a map of a surrounding area, and the structure might be a suitable mount for the map, for example a public

board. Alternatively, the representation of the real environment may be a 3D model of a surrounding area, and the structure may be the model itself.

Considering the map example, individual beacons might be located at the location on the map of individual items of interest, or alternatively, the items of
5 *interest could be uniquely identified, for example by numbers, with all of the beacons* then positioned in a particular area of the supporting structure and identified in the same way, e.g. by numbers.

In the alternative 3D model embodiment, individual beacons might be located at the location on the model of individual items of interest, or alternatively, the items
10 of interest could be uniquely identified with all of the beacons then positioned in a particular area, for example to one side of the model.

In embodiments where the beacons are grouped into a particular area, it will be apparent that the beacons might be held on a physically separate structure to that supporting the representation of the real environment. Herein, the term "structure"
15 will be used to refer generally to the means for supporting the representation of the real environment and the beacons, whether that be in fact a single unitary structure or a number of separate structures.

It will be appreciated that the code transmitted by the beacon could take a variety of forms, and that at some point the code may need to be decoded in order to
20 specifically identify a required block of information. This decoding could take place within the portable device itself prior to issuance of the request to the base station, or *alternatively the code could be passed on unaltered within the request to the base* station, with the decoding then being initiated via the base station, for example by routing of the request to a server, where the code is then decoded. The decoding
25 might simply involve the use of a look-up table, or alternatively may involve more complex decoding techniques.

However, in preferred embodiments, the code is an address for a block of information accessible by the base station from a server, and the request issued by the portable device to the base station provides the address. The server may be connected
30 to databases containing the required information via any number of wired or wireless networks. In one embodiment, the databases may be provided on an Intranet.

However, in preferred embodiments, the address is a URL address for an Internet web page, the portable device is arranged to support a web browser, and the base station is arranged to transmit data to the portable device to enable the web page to be displayed via the web browser.

5 Preferably, the beacons are arranged to use a short range wireless technology to transmit the codes via the second wireless communication. In preferred embodiments, the second wireless communication takes place via an infrared signal. However, alternatively wireless technologies such as Bluetooth may be used for the second wireless communication.

10 Viewed from a second aspect, the present invention provides a portable device for receiving via a wireless network information concerning items of interest, comprising: a controller for controlling the operation of the portable device; an output mechanism for outputting information to a user of the portable device; a first interface for communicating with a base station over the wireless network via a first wireless
15 communication; a second interface for communicating with beacons provided by a structure providing a representation of a real environment identifying the items of interest, a beacon being associated with each item of interest and being arranged to transmit via a second wireless communication over a predetermined range a code identifying information associated with that item; the portable device being arranged
20 when within the predetermined range to receive via the second interface the code transmitted by the associated beacon for a particular item of interest, and to issue to the base station via the first interface a request for information based on the received code; the controller further being arranged, upon receipt of the requested information from the base station via the first interface, to cause the information to be output to
25 the user via the output mechanism.

Hence, in accordance with the second aspect of the invention, the portable device communicates with the base station over the wireless network via a first interface and communicates with beacons via a second interface. When the portable device is within the predetermined range of a beacon for a particular item of interest,
30 it can receive the code from that beacon, and based on that can generate a request for information which is transmitted onto the base station. When the required

information is returned from the base station, the portable device is arranged to output that information to the user via the output mechanism of the portable device.

In preferred embodiments, the output mechanism comprises a display device to enable the information to be visually displayed to the user. Having regard to this
5 *embodiment, the address is preferably a URL address for an Internet web page, the portable device being arranged to support a web browser, whereby the controller is arranged upon receipt of the requested information from the base station via the first interface, to cause the web page to be displayed on the display device via the web browser.*

10 In preferred embodiments, the second interface of the portable device comprises an infrared detector for detecting infrared signals transmitted by the beacon.

In one embodiment, the beacons may be arranged to transmit the respective codes either continuously or at periodic intervals via directional infrared signals, and
15 the portable device is then arranged to receive the code for a particular item of interest by pointing the infrared detector towards the associated beacon whilst in the predetermined range.

Alternatively, the portable device may further comprise an input mechanism for enabling the user to interact with the portable device, wherein the user can obtain
20 information for a particular item of interest whilst in the predetermined range by indicating to the controller via the input mechanism that information is desired. the controller being arranged on receipt of the indication from the user to cause the second interface to output a signal to the beacon to cause the beacon to transmit the code.

25 In yet another embodiment, the structure may provide activation devices such as switches or push buttons associated with the beacons, such that a user can activate a particular beacon via the corresponding activation device, thereby causing the beacon to transmit its code.

Viewed from a third aspect, the present invention provides a method of
30 distributing to a portable device within a wireless network information concerning items of interest, a base station being provided for communicating with a portable

device over the wireless network via a first wireless communication, and a structure being provided that has a representation of a real environment identifying the items of interest, and provides a beacon associated with each item of interest that is arranged to transmit via a second wireless communication over a predetermined range a code
5 identifying information associated with that item, the method comprising: when the portable device is within the predetermined range, receiving via the second interface the code transmitted by the associated beacon for a particular item of interest; issuing from the portable device to the base station a request for information based on the received code; upon receipt of the request at the base station, retrieving the
10 information identified by the code; and transmitting that information from the base station to the portable device to enable that information to be provided to a use of the portable device.

Viewed from a fourth aspect, the present invention provides a method of operating a portable device to receive via a wireless network information concerning
15 items of interest, the portable device having a first interface for communicating with a base station over the wireless network via a first wireless communication, and a second interface for communicating with beacons provided by a structure providing a representation of a real environment identifying the items of interest, a beacon being associated with each item of interest and being arranged to transmit via a second
20 wireless communication over a predetermined range a code identifying information associated with that item, the method comprising the steps of: receiving via the second interface, when within the predetermined range, the code transmitted by the associated beacon for a particular item of interest; issuing via the first interface to the base station a request for information based on the received code; and upon receipt of
25 the requested information from the base station via the first interface, causing the information to be output to the user.

Viewed from a fifth aspect, the present invention provides a computer program or computer program product for operating a portable device to receive via a wireless network information concerning items of interest, the portable device having
30 an output mechanism for outputting information to a user of the portable device, the computer program comprising: a first interface element configured in operation to

communicate with a base station over the wireless network via a first wireless communication; a second interface element configured in operation to communicate with beacons provided by a structure providing a representation of a real environment identifying the items of interest, a beacon being associated with each item of interest
5 and being arranged to transmit via a second wireless communication over a predetermined range a code identifying information associated with that item, the second interface element being arranged when the portable device is within the predetermined range to receive the code transmitted by the associated beacon for a particular item of interest; a request mechanism configured in operation to cause a
10 request for information based on the received code to be issued to the base station via the first interface element; whereby upon receipt of the requested information from the base station via the first interface element, the information is arranged to be output to the user via the output mechanism.

Viewed from a sixth aspect, the present invention provides a beacon for use in
15 a system for obtaining within a wireless network information concerning items of interest, the system having a base station for communicating with a portable device over the wireless network via a first wireless communication, and a portable device having a first interface for communicating with the base station and a second interface for communicating with the beacon, the beacon comprising: a transmitter arranged,
20 when the beacon is provided on a structure providing a representation of a real environment identifying the items of interest, to transmit via a second wireless communication over a predetermined range a code identifying information associated with an item of interest with which the beacon is associated; whereby the portable device when within the predetermined range is arranged to receive the code
25 transmitted by that beacon, and to issue to the base station a request for information based on the received code, the base station being arranged to cause the information identified by the code to be retrieved, and to transmit that information to the portable device.

Brief Description of the Drawings

The present invention will be described further, by way of example only, with reference to a preferred embodiment thereof as illustrated in the accompanying drawings, in which:

Fig. 1 provides a schematic illustration of a system in accordance with a preferred embodiment of the present invention;

Figure 2 is a diagram illustrating how information is retrieved in accordance with a preferred embodiment of the present invention;

Figure 3 is a block diagram of a portable device in accordance with a preferred embodiment of the present invention;

Figure 4 is a block diagram of a beacon in accordance with a preferred embodiment of the present invention;

Figures 5 and 6 illustrate the process performed within the portable device to enable information to be retrieved in accordance with a preferred embodiment of the present invention;

Figure 7 is a flow diagram illustrating the operation of a beacon in accordance with one embodiment of the present invention; and

Figure 8 is a flow diagram illustrating the operation of a beacon in accordance with an alternative embodiment of the present invention.

Description of a Preferred Embodiment

Figure 1 provides a schematic illustration of a system in accordance with a preferred embodiment of the present invention. In accordance with this embodiment, a map 20 is provided to represent a real environment, for example a town. This map might typically be mounted on a public board in a location where it is readily accessible to the general public, for example a shopping centre. In preferred embodiments, the map identifies key locations and places of interest within the surrounding area, for example the cinema, the airport, the football club, etc. Although specific items of interest such as these would typically be positioned on the map so as to show their actual location, it is also possible for more generic items of interest to be identified. For example, if there are a number of theatres within the town, a general item of interest called "Theatres" might be identified at a suitable point on the map, for example in a margin at the right hand side of the map. Such an item of interest might be provided so that information can be

obtained about all of the performances at the various theatres, along with directions for particular theatres, etc.

In preferred embodiments, each item of interest identified on the map has a beacon 4 associated therewith which is arranged to transmit a code over a predetermined range. In preferred embodiments, the beacons use infrared signals, for example infrared ASK (Amplitude Shift Keying) signals. Alternatively, IrDA (Infra red Data Association) signals might be used. By use of an appropriate lens facility, such beacons can be arranged to transmit codes over a range of 2 to 3 meters.

In one embodiment, the beacons are embedded in the map at the position where the item of interest is identified. However, in an alternative embodiment, the beacons may be positioned in a particular area of the map, e.g. a margin, and each beacon identified as relating to a particular item of interest e.g. by appropriate numbering of the items of interest and the beacons.

Individuals wishing to make use of such a mapping system as that illustrated in figure 1 will need to obtain a portable device 6 which is able to receive the codes transmitted by the beacons. Preferably the device is arranged to communicate over a high speed wireless network 1 such as UMTS, Bluetooth or Wireless LAN with a wireless base station 2. However, in addition, the portable device 6 is also provided with a second interface for communicating with beacons 4 provided on the map 20.

In one embodiment, the beacons 4 may be arranged to transmit at predetermined intervals, or continuously, codes relevant to the items of interest with which they are associated, and in this embodiment the beacons would preferably be arranged to transmit directional infra red signals. When a user of the portable device has identified an item of interest on the map 20, then in this embodiment the user would point the portable device towards the beacon associated with that item of interest in order to receive the code transmitted by the beacon.

In an alternative embodiment, the beacons may be arranged to only transmit codes when requested by the user of a particular portable devices. In one such embodiment, once a user has chosen an item of interest on the map, he/she would typically enter a command into the portable device to cause the portable device to send a signal to one of the beacons. In this embodiment, the portable device 6 may be provided

with a directional transmitter, such that when the user points the portable device towards the appropriate beacon, and enters the relevant command, then an infra red signal is transmitted to that beacon. This signal will cause the beacon to transmit its code for reception by the portable device 6.

5 It will be appreciated that in this later embodiment, it is not necessary that the portable device be fitted with a directional infra red transmitter. Alternatively, the beacons might be identified by unique identifiers on the maps, for example by individual numbers, and the command entered by the user of the portable device may include a specification of the unique identifier for a particular beacon. The signal transmitted from
10 the portable device 6 may then include that unique identifier, such that only the relevant beacon reads and acts upon the received infra red signal.

 In an alternative embodiment, the supporting structure for the map 20 may provide activation devices such as switches or push buttons associated with the beacons, such that a user can activate a particular beacon via the corresponding
15 activation device, thereby causing the beacon to transmit its code. For example, each item of interest may be numbered, and correspondingly numbered push buttons may be provided to one side of the map. When a user pushes a particular pushbutton, then the corresponding beacon will transmit the code for reception by the user's portable device.

20 Once the portable device 6 has received a code from a particular beacon 4, it is arranged to issue to the wireless base station 2 via the wireless network 1 a request for information based on the received code. The code may be such that it needs to be decoded in order to identify a particular item of information, in which case either the portable device 6, or a designated server to which the request is routed via the wireless
25 base station 2, can be arranged to perform the necessary decoding. However, in preferred embodiments, the code specifies an address for the item of information, which can be used directly to retrieve the information without the need for decoding. In this embodiment, the wireless base station 2 is arranged to employ a server 8 to retrieve the information from a Intranet or Internet 7 with which it is networked. The information is
30 then transmitted back to the portable device 6 via the wireless network 1, where it is

output to the user via an appropriate interface, e.g. a display provided on the portable device.

Given the current proliferation of the World Wide Web (WWW), the information associated with the items of interest are preferably provided by web pages on the Internet, and the portable device 6 is arranged to support a web browser, such that web pages can be displayed to the user, these web pages being down-loaded via the wireless base station 2 based on the codes (in this embodiment URL addresses) received by the portable device 6 from individual beacons 4.

By this approach, it will be appreciated that the high speed wireless network 1 can be used to retrieve information concerning items of interest to the user of the portable device 6, the items of interest being identified by the user with reference to the map 20.

It will be appreciated that the map may be replaced with any other suitable representation of a real environment, for example a 3D model. The beacons may be located on the model itself or adjacent to the model.

Hence, it will be appreciated that the above system makes use of a simple web authored database of information, which can be accessed based on codes received by the portable device from particular beacons. An allocated web site that exists on the Internet or Intranet may be accessed and updated from the main server 8, and in preferred embodiments a web site is responsible for delivering information on items of interest identified by individual users.

It will be appreciated that the portable device illustrated in Figure 1 may take a variety of forms. In preferred embodiments, each device has a LCD on which information regarding the item of interest is displayed in the form of a web browsing interface. The user can scroll through information and move forward and backward to links to find out more information. Further, in preferred embodiments, the device has the ability to save key information that the user wishes to keep. It would then be possible for the user to subsequently print the information, download the information as a data file, or e-mail the information to a desired e-mail address.

The mechanism used in preferred embodiments for communication between the beacon 4 and the portable device 6 will now be described in more detail with reference to figure 2. In the embodiment illustrated in Figure 2, the beacon 4 can be arranged to

communicate with the portable device 6 via infrared. The infrared beacon 4 may be arranged to transmit a code continuously, or to transmit the code at periodic intervals, for pickup by any portable device 6 within the infrared pickup range of the beacon. In preferred embodiments, the beacon 4 transmits a pre-programmed code, preferably a web address, to the device 6, via infrared. The web address received in the form of a URL link is then preferably updated to the web browser that resides in the portable device 6. Then, the web browser causes the portable device to issue a request over the network 1 for that particular web page, assuming that the web address relates to a web page not stored locally on the portable device. This information is loaded from the Internet/Intranet 7 by the server 8, and then retransmitted via the wireless base station 2 to the portable device 6, for display on the web browser interface.

In an alternative embodiment, the portable device 6 may be arranged to contact the beacon 4 first, prior to any signal being issued by the beacon. This may take the form of a periodic signal sent automatically by the portable device 6, or alternatively the transmission of the infrared signal may be activated directly by the user of the portable device. Based on the signal received from the portable device, the beacon 4 then transfers a pre-programmed code, preferably a web address, to the device 6, via infrared, and the process then proceeds as described above. The use of a specific request signal from the portable device 6 enables some tailoring of the code returned from the infrared beacon 4 to take account of individual users. For example, some default beacons could be used to obtain information about the user (age group, language to be used, etc). Having gathered this information for a particular portable device, the infrared beacon 4 can be arranged to transmit a code appropriate for the particular portable device.

Figure 3 is a block diagram illustrating the main components of the portable device 60 of preferred embodiments of the present invention. Portable device 60 contains a microprocessor 100 for performing the key processing operations of the portable device. Power supply 105, such as a rechargeable battery, is used to provide the power required by the microprocessor 100 to operate the portable device. A touch screen 210 is provided to enable a user to interact with the portable device, so as to enable responses to particular questions to be made, and to enable the user to browse through the web information provided. Further, a speaker 120 and/or an audio output port 130 to

enable external headphones to be fitted, are provided, such that audio signals generated by a CODEC 110 can be output to the user.

The portable device 60 has two interfaces, the first being in preferred embodiments a Wireless LAN interface 140 to enable the portable device to
 5 communicate via the pervasive network 1 with the wireless base station 2. Further, in preferred embodiments, the second interface is an infrared interface 150 to enable the portable device to communicate with the beacons 40.

In preferred embodiments, the web pages are displayed on a LCD display 170, the touch screen 210 being located on the LCD display. Further, a serial port 160 is
 10 preferably provided to enable information stored on the portable device to be downloaded at a suitable point.

As illustrated in Figure 3, the portable device 6 is also arranged to support a web browser 220 to facilitate the retrieval of web pages based on URL addresses obtained from beacons.

15 In addition, the portable device 60 contains various memories for storing both the code executed on the microprocessor 100 and the information retrieved, including particular items of information saved by the user. In preferred embodiments, these memories take the form of flash subsystem 180, an EPROM 190 and DRAM 200. Typically, the default boot code is located in the EPROM 190, the flash subsystem 180 is
 20 configured with a file management system and provides caching for the web browser, and the DRAM 200 is used for executing the applications.

Figure 4 is a block diagram illustrating the core components of the beacon 4. The beacon has a microprocessor 300 for performing the main processing within the beacon. A power supply 310 is used to provide the power to the microprocessor, and may take
 25 the form of a mains powered supply, or a rechargeable battery. An infrared interface 320 is provided to enable signals to be received from the portable device 6 (if necessary) and for signals to be transmitted to the portable device 6. A serial interface 330 is provided to enable information to be loaded into the beacon (e.g. new URL details), and/or downloaded from the beacon.

30 A random access memory (RAM) 340 is provided from which applications can execute under the control of the microprocessor 300. The RAM may also be used to

store codes to be transmitted by the beacon. Further, an EPROM 360 stores default code, and an E2PROM 350 is used to store slow changing information such as security IDs, etc, or copies of the codes to be transmitted by the beacon.

Figure 5 is a flow diagram illustrating the basic operation of the portable device when arranged to retrieve information in accordance with the preferred embodiment of the present invention. The process starts at step 400, and then at step 410 the system is initialised. At this point, the wireless interface would be initialised, transmit and receive buffers would be created, etc. At step 420, a periodic timer is then started which automatically resets itself when it times out, and at step 430 it is determined whether that timer has timed out. Accordingly, a timer may be set such that it times out after a desired interval, for example every second. Accordingly, at step 430, once that time interval has elapsed, the timer will have timed out, and in that event the process proceeds to step 440, where an infrared receive buffer is read. With reference to Figure 3, the infrared receive buffer may be provided within the DRAM 200, and preferably takes the form of a First-In-First-Out (FIFO) buffer. Signals received by the infrared port 150 from beacons are routed into the infrared receive buffer within the DRAM 200.

At step 450, the information retrieved from an entry in the infrared receive buffer is then parsed in order to determine a URL address within that information. Once the URL address has been read, it is determined at step 460 whether that URL address is new, and if not the process returns to step 430 to await the timing out of the periodic timer.

However, if the URL is new, and hence the information concerning that URL has not yet been retrieved, then the process proceeds to step 470, where the portable device is arranged to browse to that URL in order to retrieve new information. The process performed at step 470 is illustrated in more detail with reference to Figure 6.

As illustrated in Figure 6, the process starts at step 500, and proceeds to step 510, where the URL address retrieved from the infrared receive buffer 440 is made available to the browser provided within the portable device 6. Typically, this merely involves control software entering the URL address into the web browser as a new URL address to be retrieved.

At step 520, the web browser determines whether the URL made available at step 510 is referencing material already on the client device, and if it is, the appropriate web page is retrieved from local storage within the portable device and displayed to the user at step 550. The process then moves to step 560, where the process ends. However, 5 assuming the URL address does not reference material already on the client device, then the web browser is caused to initiate a request for the web page specified by that URL. As discussed earlier, this involves the portable device issuing a request over the wireless network 1 via the interface 140. This request is received by the wireless base station 2, and routed to the server 8 which is then responsible for retrieving the information. Once 10 the information has been retrieved, that information is passed back to the wireless base station 2 for transmission to the portable device 6.

Once the response is received by the portable device from the wireless base station 2, the portable device is then arranged to act accordingly (step 540). Hence, for example, assuming a valid web page is retrieved, then the web browser will be used to 15 display that web page to the user. Alternatively, if an error message is received, for example because the URL is invalid, then the portable device is arranged to display that error message to the user. The process then proceeds to step 560, where the process terminates. Once step 560 is reached, that completes the processing at step 470 in Figure 5, and accordingly the process then returns to step 430 to await the timing out of the 20 periodic timer.

One embodiment of the beacon that may be used will now be described further with reference to Figure 7. As described in Figure 7, the beacon is started at step 600, and proceeds to step 610, where the beacon is initialised. At this stage, operating code will be loaded into RAM, the infrared interface parameters will be set, transmit buffers 25 will be created, etc. Then, at step 620, a timer is set running, and at step 630 it is determined whether that timer has timed out. If not, the process remains at step 630 until the timer has timed out, at which point the process proceeds to step 640, where a predetermined URL is transmitted via the infrared interface 320 of the beacon 4. The timer is then reinitialised at step 650, and the process returns to step 620 where the timer 30 is again set running. By this approach, the beacon is arranged to periodically transmit the

code, for example twice every second, such that any portable device moving into the pickup range of the beacon will automatically receive the code.

In an alternative embodiment, the beacon can be arranged such that it only transmits the URL upon receiving a specific request. Hence, with reference to Figure 8, 5 the beacon is started, and the first step (step 710) is to initialise the beacon. Then, at step 720, it is determined whether a request has been received by the beacon to send an infrared signal containing the URL. This request may be received from the portable device 6 under appropriate control of the user, for example by the user entering a command into the portable device to cause the device to send a request signal to the 10 beacon. However, alternatively, if the location of the beacon is appropriate, a nearby activation device (e.g., a push button, a switch or the like) associated with the beacon may be used, such that when a user activates the activation device, the beacon is arranged to transmit its code.

If no request is received, the process loops back to step 720, until such time as a 15 request is received. Then, once a request is received, the process proceeds to step 730, where a predetermined URL is transmitted via the infrared interface 320. The process then returns to step 720 to await a subsequent request.

Although a particular embodiment of the invention has been described herewith, it will be apparent that the invention is not limited thereto, and that many modifications 20 and additions may be made within the scope of the invention. For example, various combinations of the features of the following dependent claims could be made with the features of the independent claims without departing from the scope of the present invention.

CLAIMS

1. A system for obtaining within a wireless network information concerning items of interest, comprising:
 - 5 a base station for communicating with a portable device over the wireless network via a first wireless communication;
a structure providing a representation of a real environment identifying the items of interest, and providing a beacon associated with each item of interest and arranged to transmit via a second wireless communication over a predetermined range
 - 10 a code identifying information associated with that item;
a portable device having a first interface for communicating with the base station and a second interface for communicating with the beacon;
the portable device being arranged when within the predetermined range to receive via the second interface the code transmitted by the associated beacon for a
 - 15 particular item of interest, and to issue to the base station via the first interface a request for information based on the received code;
the base station being arranged to cause the information identified by the code to be retrieved, and to transmit that information to the portable device.
- 20 2. A system as claimed in Claim 1, wherein the code is an address for a block of information accessible by the base station via a server, and the request issued by the portable device to the base station provides the address.
3. A system as claimed in Claim 2, wherein the address is a URL address for an
- 25 Internet web page, the portable device is arranged to support a web browser, and the base station is arranged to transmit data to the portable device to enable the web page to be displayed via the web browser.
4. A system as claimed in any of claims 1 to 3, wherein the second wireless
- 30 communication takes place via an infrared signal.

5. A portable device for receiving via a wireless network information concerning items of interest, comprising:

a controller for controlling the operation of the portable device;

an output mechanism for outputting information to a user of the portable
5 device;

a first interface for communicating with a base station over the wireless network via a first wireless communication;

a second interface for communicating with beacons provided by a structure providing a representation of a real environment identifying the items of interest, a
10 beacon being associated with each item of interest and being arranged to transmit via a second wireless communication over a predetermined range a code identifying information associated with that item;

the portable device being arranged when within the predetermined range to receive via the second interface the code transmitted by the associated beacon for a
15 particular item of interest, and to issue to the base station via the first interface a request for information based on the received code;

the controller further being arranged, upon receipt of the requested information from the base station via the first interface, to cause the information to be output to the user via the output mechanism.

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6. A portable device as claimed in Claim 5, wherein the code is an address for a block of information accessible by the base station via a server, and the request issued by the portable device to the base station via the first interface provides the address.

25 7. A portable device as claimed in Claim 5 or Claim 6, wherein the output mechanism comprises a display device to enable the information to be visually displayed to the user.

8. A portable device as claimed in Claim 6 and Claim 7, wherein the address is a
30 URL address for an Internet web page, the portable device being arranged to support a web browser, whereby the controller is arranged upon receipt of the requested

information from the base station via the first interface, to cause the web page to be displayed on the display device via the web browser.

9. A portable device as claimed in any of claims 5 to 8, wherein the second
5 interface comprises an infrared detector for detecting infrared signals transmitted by the beacon.

10. A portable device as claimed in Claim 9, wherein the beacons are arranged to transmit the respective codes at periodic intervals via directional infrared signals, and
10 the portable device is arranged to receive the code for a particular item of interest by pointing the infrared detector towards the associated beacon whilst in the predetermined range.

11. A portable device as claimed in any of claims 5 to 9, further comprising an
15 *input mechanism for enabling the user to interact with the portable device, wherein the user can obtain information for a particular item of interest whilst in the predetermined range by indicating to the controller via the input mechanism that information is desired, the controller being arranged on receipt of the indication from the user to cause the second interface to output a signal to the beacon to cause the*
20 beacon to transmit the code.

12. A method of distributing to a portable device within a wireless network information concerning items of interest, a base station being provided for communicating with a portable device over the wireless network via a first wireless
25 communication, and a structure being provided that has a representation of a real environment identifying the items of interest, and provides a beacon associated with each item of interest that is arranged to transmit via a second wireless communication over a *predetermined range* a code identifying information associated with that item, the method comprising:

when the portable device is within the predetermined range, receiving via the second interface the code transmitted by the associated beacon for a particular item of interest;

issuing from the portable device to the base station a request for information
5 based on the received code;

upon receipt of the request at the base station, retrieving the information identified by the code; and

transmitting that information from the base station to the portable device to enable that information to be provided to a use of the portable device.

10

13. A method of operating a portable device to receive via a wireless network information concerning items of interest, the portable device having a first interface for communicating with a base station over the wireless network via a first wireless communication, and a second interface for communicating with beacons provided by
15 a structure providing a representation of a real environment identifying the items of interest, a beacon being associated with each item of interest and being arranged to transmit via a second wireless communication over a predetermined range a code identifying information associated with that item, the method comprising the steps of:

receiving via the second interface, when within the predetermined range, the
20 code transmitted by the associated beacon for a particular item of interest;

issuing via the first interface to the base station a request for information based on the received code; and

upon receipt of the requested information from the base station via the first interface, causing the information to be output to the user.

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14. A computer program for operating a portable device to receive via a wireless network information concerning items of interest, the portable device having an output mechanism for outputting information to a user of the portable device, the computer program comprising:

30 a first interface element configured in operation to communicate with a base station over the wireless network via a first wireless communication;

a second interface element configured in operation to communicate with beacons provided by a structure providing a representation of a real environment identifying the items of interest, a beacon being associated with each item of interest and being arranged to transmit via a second wireless communication over a
 5 predetermined range a code identifying information associated with that item, the second interface element being arranged when the portable device is within the predetermined range to receive the code transmitted by the associated beacon for a particular item of interest;

a request mechanism configured in operation to cause a request for
 10 information based on the received code to be issued to the base station via the first interface element;

whereby upon receipt of the requested information from the base station via the first interface element, the information is arranged to be output to the user via the output mechanism.

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15. A beacon for use in a system for obtaining within a wireless network information concerning items of interest, the system having a base station for communicating with a portable device over the wireless network via a first wireless communication, and a portable device having a first interface for communicating with
 20 the base station and a second interface for communicating with the beacon, the beacon comprising:

a transmitter arranged, when the beacon is provided on a structure providing a representation of a real environment identifying the items of interest, to transmit via a second wireless communication over a predetermined range a code identifying
 25 information associated with an item of interest with which the beacon is associated;

whereby the portable device when within the predetermined range is arranged to receive the code transmitted by that beacon, and to issue to the base station a request for information based on the received code, the base station being arranged to cause the information identified by the code to be retrieved, and to transmit that
 30 information to the portable device.

16. A system for obtaining within a wireless network information concerning items of interest, substantially as hereinbefore described with reference to the accompanying drawings.

5 17. A portable device for receiving via a wireless network information concerning items of interest, substantially as hereinbefore described with reference to the accompanying drawings.

18. A method of distributing to a portable device within a wireless network
10 information concerning items of interest, substantially as hereinbefore described with reference to the accompanying drawings.

19. A method of operating a portable device to receive via a wireless network information concerning items of interest, substantially as hereinbefore described with
15 reference to the accompanying drawings.

20. A computer program for operating a portable device to receive via a wireless network information concerning items of interest, substantially as hereinbefore described with reference to the accompanying drawings.

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21. A beacon for use in a system for distributing within a wireless network information concerning items of interest, substantially as hereinbefore described with reference to the accompanying drawings.



Application N : GB 9917415.3
Claims searched: 1-21

Examiner: John Betts
Date of search: 10 February 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): H4L (LDPP, LDGX, LDLX) G5G (G2)

Int Cl (Ed.7): G09B 29/10 G09B 5/06 H04Q 7/22

Other: On-line: WPI, EPODOC, JAPIO, INSPEC

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims.
X, Y	GB2327565 A (IBM) whole document, note use of URL as code for item.	1,5,12,13, 14,15 at least
Y	GB2275120 A (MediMark) points of interest data extracted from barcodes on map	1,5,12,13, 14,15 at least
X, Y	US5929848 (Visible Interactive) information may be relayed from central database.	1,5,12,13, 14,15 at least
X, Y	US5732326 (Fujitsu) whole document	1,5,12,13, 14,15 at least
X, Y	US5796351 (Fujitsu) whole document	1,5,12,13, 14,15 at least

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